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A Huddle of Elephant Seals on Heard Island

Photo: J. Béchervaise

Lecture

At Nicholas Hall in Lonsdale Street at 8 p.m. on Friday, 15 August, Mr. John Béchervaise will lecture on Albatrosses. The Native Fauna Conservation Society are sponsoring the meeting. A silver coin to cover expenses, is asked to be subscribed.

The Victorian Naturalist

Editor: G. M. Ward
Assistant Editor: P. Gahan



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Front Cover:

A large granite tor, split open along a joint plane by repeated daily heating and cooling over a considerable period of time. The boulder is within the Tidbinbilla National Park. Situated some 30 miles west of Canberra, A.C.T.

photo: Ken G. Simpson

CORRECTION—The editor apologizes for his obvious mistake in the caption for the cover photo in the April, *Vict. Nat.* The moth was of course a female, not a male Gum Emperor Moth.

June, 1969

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JUL 30 1969

Axe-Grinding Rocks near Munro, Central Gippsland, Victoria

by ALAN L. WEST*

Introduction

This paper provides detailed information concerning four contiguous axe-grinding workshops near Munro, seven miles east of Stratford in central Gippsland, Victoria. The rocks are low outcrops of horizontally-bedded ferruginous sandstone.

Two of the outcrops (here designated Sites 2 and 3) were briefly mentioned by Massola (1967) but to my knowledge there does not exist an adequate description of this type of relic in Victoria.

Massola (1962, 1964, 1965, 1968) has given the location of, and some information on, other similar sites in Victoria. In Gippsland, apart from the four sites described here, there is another at Boisdale, approximately thirteen miles west of the Munro rocks. Another is situated at Earlston in north-eastern Victoria. In the Western District, there are two known outcrops where grinding rocks exist, one at Gellibrand and a second on the property "Fernlea", formerly part of Nareeb Station, about fourteen miles south of the Glenthompson.

In the manufacture of ground-edge axes, pieces of suitable stone were prepared by flaking or by flaking and hammer-dressing. These roughly shaped blanks were then ground by being rubbed on softer stone. Where suitable sandstone outcrops existed, the fixed rocks were utilized but in the

absence of these, portable stones were used.

Spencer (1928) has given an account of the axe-grinding process. The Aboriginal he observed took a sandstone mill, or "nardoo stone", and rubbed his axe backwards and forwards on it in order to produce a suitable cutting edge. Sand and water, occasionally sprinkled on the mill, gave additional abrasive qualities to the grinding block. The rocks at Munro were probably used in much the same way but would have had the advantage of being fixed in the ground.

Location of the Grinding Rocks

The axe-grinding rocks at Munro are almost equi-distant between the Avon River at Stratford, seven miles to the west, and the Perry River to the east. Lake Wellington at the western end of the Gippsland Lakes system lies some nine miles to the south-east.

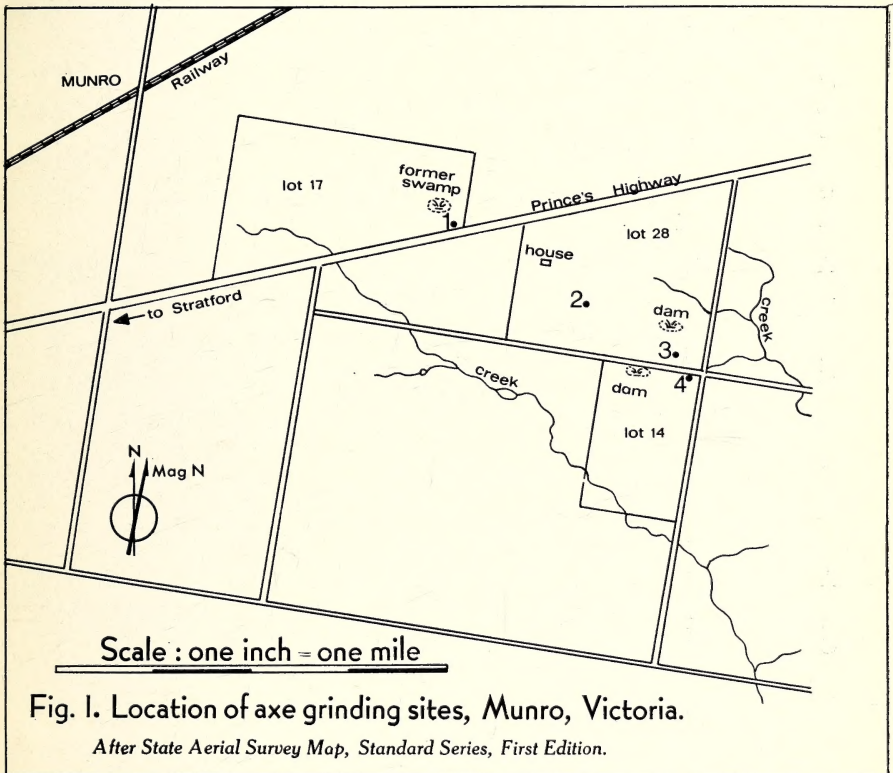
Site 1, the most northerly of the four workshops is located beside and to the north of the Prince's Highway on the property "Blue Hills", owned by Mr. S. Dunsmuir. The remaining sites are situated approximately in a straight line over a distance of 1 mile 35 chains to the south-east of Site 1. They are all south of the Prince's Highway. Sites 2 and 3 are both on the property "Eastwood", owned by Mr. S. C. Fletcher, and Site 4 is on the "Fernbank" property of Mrs. U. Rash. Exact location references are given in Table 1 below, and the sites are shown in map, Fig. 1.

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TABLE 1

Location of Axe-grinding Sites, near Munro, Central Gippsland, Victoria.

Site	Lot Numbers on Parish Plan (Yeerung, Country of Tanjil, 2" to 1 mile, Dept. of Lands and Survey, Melb. 1959)	Central Gippsland, Victoria Grid References on Aerial Survey Map (Stratford C, First Ed. Std. 2" to 1 mile Series)
1	17	175227
2	28	181218
3	28	189213
4	14	191211



General

Between May 1967 and September 1968 a total of six days was spent in studying and recording the Munro workshops. On one visit lasting three days the author was accompanied by Mr. R. Miller, of the Education Service of the National Museum of Victoria. Drawings of all the grinding rocks

with their associated grooves were made by Mr. Miller in addition to plans showing the distribution of the abraded rocks at each site. Figure 3 shows the plan of Site 3 with drawings of the rocks and axe-grinding grooves.

Table 2 gives the dimensions of the exposed parts of the rocks at each site, and of the grinding grooves.

TABLE 2

Dimensions* of Grinding Rocks and Grooves at Sites 1 to 4, near Munro, Central Gippsland, Victoria.

* All measurements in inches.

Site Number	Exposed Surface of Rocks		No. of Grinding Grooves per rock	Grinding Grooves				
	Length	Width		Length	Width	Depth		
1	A	27	17	2	5 6 12 *10 7½	2½ 2½ 6½ 3 4	3/16 ¼ ⅝ 7/16 ½	
	B	31	16½	2	12 12 *7½ 5 7½	4½ 4½ 1½ 2½ 3	5/16 ⅜ 3/16 3/16 ½	
	C	21	12	1	10½	4½	¼	
	D	19	13	1				
	E	17	12	2				
	F	18	9½	1				
	G	14½	13	1				
	2	A	42	26	4	6 9 7½ 9½	2 2½ 2 3	3/16 ¼ ⅝ ½
		B	26	15	1	13	8½	1
		C	30	17	2	8 16	2½ 6	9/16 1
		D	14	7	1	7	2½	⅝
		E	27	17	1	9	2½	5/16
F		38	22	1	10	3½	9/16	
G		15	9	1	7½	3	5/16	
H		21	9½	1	8	2½	⅜	
I		16	15	1	12	3½	5/16	
3		A	26	14	2	6½ 13 9	2 9 6½	3/16 1½ ½
		B	14	10	1	13	6½	1
		C	25	11	3	7 7 10 9 8½	2½ 2½ 2½ 6 3½	⅝ ¼ ⅝ ⅝ ¼
	D	40	22	3				
	4	A	43	19	1	9	4½	1
		B	20	18	1	8½	5½	⅝
		C	31	23	3	8½ 11 8½	2½ 2½ 5	⅜ ⅜ ½
		D	21½	16½	1	11	6½	⅝
		E	38	33	1	19	8	1½
		F	39	23	1	*10 9	4 6	— 1

* A second grinding facet extending the main groove.

Description of Sites

Site 1—

The grinding rocks of Site 1 are found in the south-east corner of a cleared paddock (Lot 17) amongst a scattered sandstone outcrop; they rise from one to three inches above the present soil surface. The stone, similar to that at all of the sites, is reddish coloured. It varies in texture, but much is composed of grit-sized grains of uniform size. Seven of the boulders at the outcrop, obviously carefully selected because of their suitability for axe-grinding purposes, bear a total of 11 abraded grooves. They are distributed over an area of 130 feet (N-S) by 186 (E-W).

One of the axe-grinding rocks at

this site (Rock E), was found to have been recently partly excavated, and with the permission of the property owner it was removed and added to the collections of the National Museum of Victoria. (x72485, see Plate.)

The grooves vary in length from 5" to 12", in width from $1\frac{1}{2}$ " to $6\frac{1}{2}$ ", and in depth from $\frac{1}{4}$ " to $\frac{3}{4}$ ". Because of alluvial soil build-up there may well be additional grinding rocks, as yet undetected, at Site 1. The same could apply to Sites 2 and 4. Eight chains from the workshop, in a north-westerly direction, a depression exists which before draining was a swamp. The Aborigines possibly drew water from this swamp for use in the axe-grinding process.



Plate 1.

Rock E, one of the axe-grinding rocks found at Site 1.

Site 2—

This is 63 chains to the south-east (111°)* of Site 1. Within a sandstone outcrop in a cultivated paddock (Lot 28) there are nine rocks which have been used to sharpen stone axes. The abraded rocks which outcrop no more than 6", cover an area of 48 feet (N-S) by 27 feet (E-W). A total of 13 grooves range in length from 6" to 16", in width from 2" to $8\frac{1}{2}$ ", and in depth from $\frac{3}{16}$ " to 1". Rock A of this group is 24 chains south-east (127°) of the "Eastwood" homestead. A dam constructed in a former swamp lies 35 chains to the east (98°).

Site 3—

This is also situated in a cultivated paddock on "Eastwood" but is 42 chains south-east (112°) of Site 2. At this workshop four sandstone rocks, which outcrop 1" to $2\frac{1}{2}$ ", bear nine axe-grinding grooves. A loose piece of freshly shattered rock† measuring $6\frac{1}{2}$ " x 4" x $2\frac{1}{2}$ " and bearing part of an axe-grinding groove 4" x $2\frac{3}{4}$ " x $\frac{3}{8}$ " was found at this site. It is evidence that at least one of the original rocks may have disappeared. Before the area around the present rocks was cultivated, the site may well have been more extensive. The existing abraded rocks lie roughly in a straight line north-west to south-east and cover a distance of 24 feet. The grinding grooves vary from $6\frac{1}{4}$ " to 13" in length, from 2" to 9" in width, and from $\frac{1}{4}$ " to $1\frac{1}{8}$ " in depth.

Between May 1967 and September 1968 Rock A was accidentally damaged by a heavy earth-moving machine. The result was that the smaller of the two grooves (see Table 2) has, in part, been fractured from the rock surface and now measures only $6\frac{1}{4}$ " x 2".

* Magnetic North compass readings given throughout.

† N. M. V. X 72202.

Before damage it was probably 9" x 3" (see Massola 1967, p. 209, Group 2, Rock C). Two nearby dams indicate the sites of former swamps. One to the north-west (341°) is 11 chains away, and the other is south-west, also 11 chains distant, in a paddock (Lot 14) on the property of Mrs. U. Rash. Site 4 (below) is 17 chains east (90°) of this dam.

Site 4—

This is located $10\frac{1}{2}$ chains to the south-east (138°) of Site 3, on the "Fernbank" property of Mrs. U. Rash. The six grooved rocks are part of an extensive low outcrop of sandstone in the north-east corner of Lot 14, a cultivated paddock. Five of the rocks are scattered over an area of 44 feet (N-S) by 37 feet (E-W); Rock A is separated from the others by a distance of almost two chains. There are eight grinding grooves, in all, ranging from $8\frac{1}{2}$ " to 19" in length, $2\frac{1}{2}$ " to 8" in width, and in depth from $\frac{3}{8}$ " to $1\frac{1}{8}$ ".

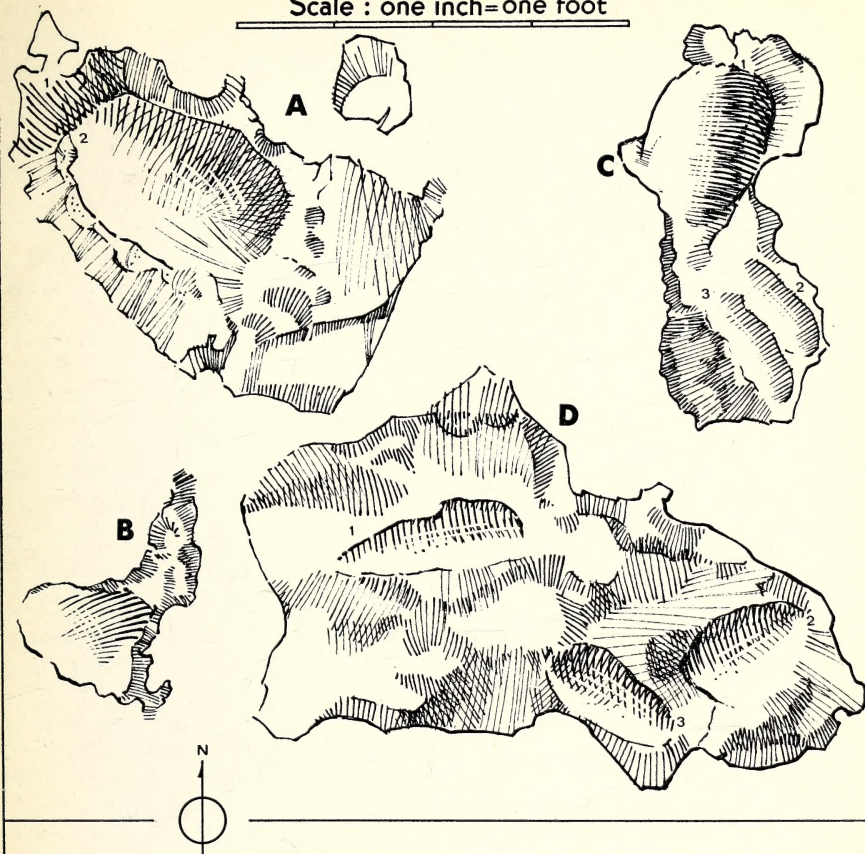
Discussion

Massola's paper (1967), which includes references to Munro Sites 2 and 3, goes beyond the evidence in drawing conclusions. In effect his argument is that the narrower grinding grooves were places where "ordinary" axes were ground, whereas the wider grooves (in excess of 5") resulted from the grinding of large "super-axes". He claims also that the "super-axes" were used as hoes to dig out wombats, but it is most improbable that stone axes of any kind were used for this purpose.‡

The Aborigines of Gippsland did not make ground-edge axes which could appropriately be called "super-axes". Further, it will be seen from Table 2 that only 12 of 41 grinding grooves at Munro are 5" or more in width. Five of these reveal features which negate

‡ See Buckley's account of wombat excavation carried out with digging sticks, and baskets for earth removal, in Morgan (1967).

Scale : one inch=one foot



Scale : one inch=eight feet



Fig. 2. Plan of Site 3 with drawing of rocks.

any "super-axe" supposition. For instance, the groove on Rock E at Site 4 has a second grinding area extending for 10" along its eastern side. This is 4" wide, and had the grinding process continued it is most likely that the main groove and the extension would have merged into one very wide depression. There is a similar grinding extension on the southern side of Groove 2, Rock B at Site 1.

Three other wide grooves (G1, B, S4; G1, D, S4; G1, F, S4) have surface irregularities within them indicating multiple grinding areas. Within the depression on Rock D above, three grinding grooves can both be seen and felt and there two grinding *slots* within each of the other two. We suggest therefore that a simpler explanation for the wide grinding grooves at Munro, and one which accords better with the evidence, is that they were formed by the merging of two or more narrower depressions. Compare the widening grinding-facet alongside the main groove on Rock E, Site 1 (Plate) and the drawing of merging grooves 2 and 3 on Rock C, Site 3 (Fig. 2).

However, the Munro grinding rocks are prehistoric relics. All that can be said with confidence, is that stone axes were ground thereon. In Fig. 3, the lenticular cross-section of a ground-edge axe is shown adjacent to the transverse cross-section of a typical grinding groove. A comparison of the two cross-sections reveals a very neat *fit*; the convex shape of the axe matches the concavity which was formed in the softer sandstone rock by grinding action.

The stone axe figured (N. M. V. 34610—Provenance, Murray River) was randomly selected from the collections of the National Museum of Victoria, but is typical in shape, size and cross-section of many of the axes found in Victoria. It measures $5\frac{1}{10}$ " x $3\frac{3}{10}$ " x $1\frac{1}{2}$ ", is oval in shape and has a cutting edge which approximates a parabolic curve. About 1" or $\frac{1}{5}$ of each surface has been ground, and the butt-end shows the kind of pecking associated with use as a hammer stone.

It is not possible to determine when the grinding rocks were first used by Aborigines. Nor do we have any evi-

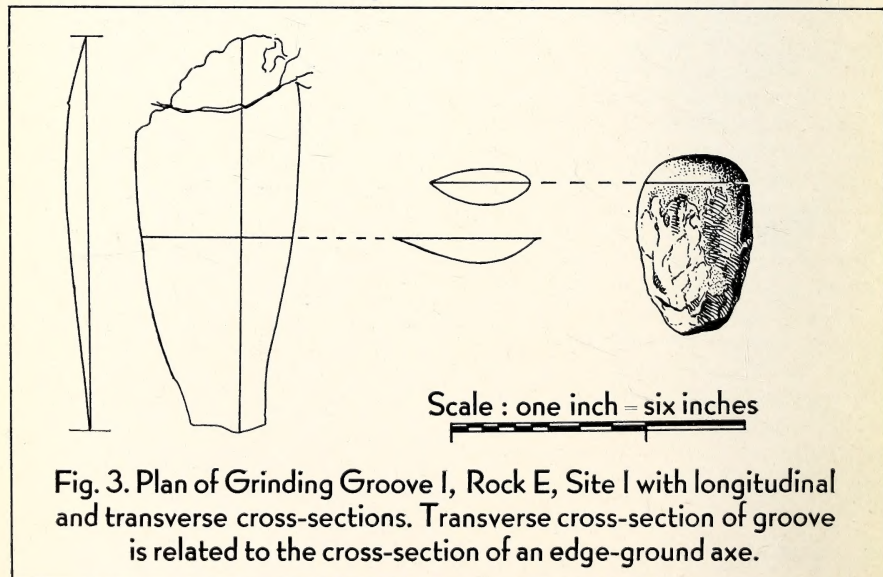


Fig. 3. Plan of Grinding Groove I, Rock E, Site 1 with longitudinal and transverse cross-sections. Transverse cross-section of groove is related to the cross-section of an edge-ground axe.

dence that they were being used at the time of European occupation of Central Gippsland, from 1840 onwards, although it is reasonable to suppose they were. If this were so, it is almost certain that they were abandoned by the early 1860's for two reasons. Firstly, the Aboriginal population had fallen away to a mere 53 individuals (Central Board for the Protection of Aborigines, Second Report, 1862) and secondly, steel axes were introduced to the Aborigines by the Central Board. The Board's first report (1861) records that six dozen tomahawks were sent to the local protector, at Stratford, in a

consignment of goods for the benefit of Aborigines.

Acknowledgements

The names of five Munro property owners who permitted me to have access to sites on their land are mentioned in the text. I am grateful to all for their co-operation, especially to Mr. S. C. Fletcher and Mr. S. Dunsmuir. Mr. R. Miller prepared the map and drawings for this paper and I wish to express my thanks to him. Helpful comments on the text were made by Messrs. D. A. Casey and K. G. Simpson.

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APPENDIX

Details of the position of two further axe-grinding sites, in the Munro area, were given to the National Museum towards the close of investigations into the sites described here.

The more extensive of the two new finds has yet to be fully recorded. The rock is in the south-west corner of Lot 8, Yeerung Sheet of the Parish Plan, on the property of Mr. N. Lee of Munro. It is situated a few yards north of Flinders Creek which cuts diagonally across the corner of the paddock, and is to the west of a ruined house. The grid reference of the Aerial Survey Map is 153192.

The sandstone outcrop, approximately 9' x 3' bears about 14 grinding grooves. Some grooves are clearly defined but others are quite shallow. The abraded rock has a texture of uniform grain size and was apparently selected

as the only rock in the outcrop suitable for grinding purposes. By contrast, the texture of other outcropping rocks is irregular, pebbly and coarse-grained.

On the nearby property of Mr. A. L. Maguire, two small sandstone rocks, which outcrop no more than 2" above the present surface, each contain one grinding groove. The rocks are in the south-west corner of Lot 22A, Yeerung Sheet of the Parish Plan, to the north of Fiddlers Creek.

One rock, still in situ, has an exposed surface of 39" x 17" and an axe-grinding groove which measures 12" x 8" x 2".

A rock immediately adjacent, with only 8" x 3" exposed, was excavated by Mr. Maguire. When not in situ it measured 21" x 11" x 9" and was marked by a grinding groove 9" x 5" x 1".

FNCV Grampians Excursion, September, 1968

by J. A. BAINES

Part 1

Saturday, August 31—The chartered coach went via Bacchus Marsh and Ballarat (where a deviation was made past the site in Humffray Street of the finding of the Welcome nugget) to Lake Learmonth, where an early lunch in the lakeside park was enjoyed. Through the Pyrenees there were further reminders of the golden years, and at Amphitheatre most of the party left the bus for a roadside walk. Passing a sign post leading to Nowhere Creek, the route led through Elmhurst, which belied its name with an avenue of pines. Ben Nevis, 2876 feet, forested, with steep rock scarps, brought a touch of nostalgia to Mrs. Lindsay Stuart-Smith (who hails from Fifeshire, Scotland).

From Ararat the route taken to Hall's Gap was via Moyston. There was further roadside botanizing near Pomonal, and this introduction to the Grampians flora was highlighted for those of the party who are more familiar with species seen on the monthly day excursions from Melbourne by the prolific flowering of Golden Heath (*Styphelia adscendens*) and Flame Heath (*S. behrii*, syn. *Astroloma conostephioides*). At Hall's Gap accommodation was at Mountain Grand guest house, with its adjunct Grampian House, where Mr. Eric Miles, who lives locally but is a member of Stawell F.N.C., called to welcome the visitors and to outline plans for the morrow.

Sunday, September 1—The writer shared the front seat with Eric Miles, who indicated points of interest as we passed the old "Mokepilly" station and searched vainly a roadside lagoon

for a Maned Goose or Wood Duck, which he had observed there several times. Its scientific name, *Chenonetta jubata*, is most apt, the generic name being Greek for "goose-duck" and the specific name Latin for "maned". Lake Lonsdale was visible in the distance, with Briggs Bluff beyond. "Ledcourt" station was notable for the information that one of its boundary riders in colonial times was Marcus Clarke, author of "For the Term of his Natural Life". We passed over Mount William Creek at Dadswell's Bridge. Much water was lying about, as the district had seven inches of rain in August. This was emu country, according to Eric, who retired to Hall's Gap after many years of farming at Mystic Park, where he often played tennis with the John Gorton who was to become prime minister.

Near the Mount Stapylton aboriginal cave shelters we were met by several car loads of members of Stawell F.N.C. (led by Mr. Ian McCann, president, and Neil Bennett, secretary), Horsham F.N.C. and Ararat F.N.C. It was a delight to find, plentiful and flowering profusely, the solanaceous shrub, *Anthocercis frondosa*, the large-leaf Ray-flower, which is rare and localized in Victoria though extending to New South Wales. At the cave site acres of *Thryptomene calycina* were in bloom, and it is good to know that this symbol of the Grampians is more adequately protected these days. A surprise was meeting there Bruce Fuhrer and his family, who had been to Kiata Lowan Sanctuary and had called at the home of Ian McCann and heard of our im-

pending visit to Mount Zero. Bruce was photographing a liverwort, and his obvious enthusiasm has not been dampened by the tremendous task recently completed with the publication of "Flowers and Plants of Victoria" (a book which, incidentally, was most useful on this trip). Lunch was taken at the picnic ground, and Ian (Dick) Morrison photographed fungi (two Morels, an Earth-star, *Geastrum triplex*, and the tiny Bird's nest Fungus, *Nidula emodens*).

The next point of interest was another shelter with aboriginal paintings (all the Grampians sites have been fully described in the *Naturalist*, so no further comment will be made on these). Grampians Heath, *Epacris impressa* var. *grandiflora*, was flowering magnificently here, and Skeleton Fork-fern, *Psilotum nudum*, was growing from clefts in the rock chasm. Hairy Correa, *C. aemula*, was common, with its characteristic hairy leaves, grey-green flowers with pink tips, and low habit of growth. Back to the bus, then we passed Mount Zero on one side and olive orchards on the other, on the way to the so-called Cave of Ghosts (or Ghost Cave), which of course is not a cave but a rock shelter, and an aboriginal water well (from a natural spring under rock). Botanical highlights here were an unusual Cup Fungus (*Peziza* sp.) (perhaps undescribed), and a superb clump of Grampians Heath.

The return trip was via Zumstein's, with its many kangaroos (encouraged by the late apiarist, William Zumstein, a booklet* about whose life was made available to us by Mrs. McKenzie, one of the Horsham F.N.C. members). The view of Mount Rosea in the distance reminded us of its distinctive Rosy Bush-pea, *Pultenaea subalpina*, seen by some of us on

previous visits, and we regretted that it would not be able to be visited this time because of a full itinerary. (We saw this species later on Mt. William, but of course its flowering season is much later.) The impressive rocky mountain slope known as the Elephant's Hide was passed before arriving back at Hall's Gap. That night there was poring over botanical books, and reading "The Grampians of Western Victoria—An Introduction", an eight-page publication issued by Stawell Town Council in conjunction with the Stawell and Grampians Tourist and Promotion Advisory Council, which had been issued to us by Mr. Ian McCann, now full-time Tourist Officer employed by the council, which deserves credit for this enlightened move. No greater authority on the area could be found than Ian, the ideal appointee for the position, and it is to be hoped that the three-year initial term will become a permanent job. The writer read "The Moora Savage", by James R. D'Alton, a member of the family so long associated with the Grampians, of whom St. Eloy D'Alton, an early contributor of botanical articles to the *Victorian Naturalist*, is best remembered. The author of the booklet of Grampians reminiscences (with its foreword by F.N.C.V. member, Mr. A. J. Swaby, who has a wide knowledge of the Grampians and its flora) died not long after the time of our visit.

Monday, September 2—Mount William trip.

Just south of Hall's Gap the valley of Fyans Creek has been dammed to form Lake Bellfield. Completed in 1966, the earth and rock-fill dam (2,286,000 cubic yards) has a crest length of 2700 feet and a maximum height of 165 feet. The storage, which we observed from the neatly built pavilion close to the road, was as yet only half full, because of the drought

* "Walter Zumstein, Pioneer" (1885-1963), published by Horsham District Historical Society.

years following construction, but with better rains the capacity of 64,000 acre feet should soon be reached. The tenacity of life of some native shrubs inundated was noted (another legacy of the drier times?). (Another example of this tenacity we had noted on passing Mrs. Bennett's property, where *Micromyrtus ciliatus* was persistent in great masses on land that had been ploughed (Deep Lead district).)

Passing over Barney's Creek, then Bovine Creek, there was speculation as to whether the latter name had any connexion with the famous "White Bull" (the Moora Savage), whose stamping ground was the Moora Swamp (Murra Murra). Those who had climbed to the summit of Mt. William in the days before the new road was built certainly earned the magnificent views that the ascent opens up—we did it the comparatively easy way. Debussing at the turntable, we passed through the gate that barred the final stretch of road to all wheeled vehicles except those of Department of Civil Aviation personnel using the modern brick building on the summit. The road was built jointly by the Country Roads Board, Tourist Development Authority, and the Commonwealth Department of Works. The one mile walk was full of botanical and geological interest, while Ken Strong (microscopist) found interesting insects and rare crustaceans. The splendour of the mountain views was something to remember and treasure, but when sunshine was followed by quick clouding over and steady drizzle, one was reminded of the bleak weather when Major Mitchell and his party had to spend a cheerless night on the summit; a tablet on the lookout (unveiled by Mr. Mibus, Minister for Water Supply and Mines, in 1963) commemorates this 1836 occasion. The dial indicator identified the great number of peaks and lakes visible

from this highest point of the Grampians (3829 feet).

It was interesting to encounter here two species usually confined to coastal habitats, Coast Beard-heath, *Leucopogon parviflorus*, and *Banksia integrifolia*, Coast Banksia. Very noticeable, despite its low habit of growth, was the dainty Pine Heath, *Styphelia pinifolia*, and also prominent were Woolly Tea-tree, *Leptospermum lanigerum*, and Dwarf Sheoak, *Casuarina pusilla*. Grampians Gum, *Eucalyptus alpina*, was here, but apparently it is much more common on the adjoining Major Mitchell Plateau, which looked enticingly close despite its as yet comparative inaccessibility. After lunch on the summit, a cold and rather damp walk brought us back to the bus.

Near Lake Bellfield we turned off to Silverband Falls. On the way a stop was made to admire (and photograph) two koalas, in an area specially declared a natural sanctuary for native fauna. Near the falls there were many trees of Cherry Ballart (*Exocarpos cupressiformis*). On to Stony Creek Road, with a view of Sundial Peak, then a walk into a fern gully. A Scrub Wren was observed on the ground near the bus. After the fern gully walk, the billy was boiled for tea in a clearing, during rain which later ceased. On the way back to Hall's Gap we saw many kangaroos in a grassy paddock beside Hotel Le Chateau (where some of us had stayed in its Hotel Bellfield days). According to Mrs. Miles, whose company we enjoyed on this trip, the present licensee is a keen protector of native animals and the kangaroos find a congenial environment near his accommodation house. At night the writer re-read "One of Nature's Wonders: The Victorian Grampians", by J. W. Audas, which can be strongly recommended, although unfortunately long out of print.

Tuesday, September 3—We awoke to the sound of early morning howling winds, but despite this, there was a particularly varied dawn chorus of bird voices, as well as the usual "crying" of a koala that lived in a tree nearby. A bus trip followed, to Stawell and up to Big Hill, where masses of wattle were in bloom (*Acacia pycnantha* and *A. armata*). From the rotunda erected in 1947 as a pioneers' memorial, sites of former gold-mining activities were pointed out, then began a walk of a mile and a half past the old mine workings of Big Hill, Perthshire Hill, Hampshire Hill and Albion respectively. The many species of flora noticed are listed in the appendix, as in the case of most other areas visited. Returning to the bus, we went on past Concongella, and then, near the J. J. Kingston Memorial Sanctuary, (a ten acre reserve set apart through the efforts of Stawell F.N.C., whose secretary, Mr. Neil Bennett, was our guide for this day), the bus became bogged in roadside slush. Opportunity was taken to botanize nearby, where the chief attraction was a great number of Blue Caladenia (*C. caerulea*). In one square inch spot there were blooming, a specimen of this lovely orchid, Golden Moths or Snake Orchid (*Diuris pedunculata*) and Scented Sundew (*Drosera whittakeri*). The sundew rosettes practically covered the ground in some parts, the white flowers above the reddish leaves producing a beautiful effect. Lunch was taken in a clearing, then a return was made to Stawell, driving past the sites of the famous Magdala mine (closed 1918) and Oriental mines, then North Cross No. 1 and No. 2 ("The Duke"—depth of shaft 1280 feet).

Neil Bennett next directed us out to the Three Jacks Sanctuary of 18 acres, named after the former mine not far away. It is good to know that this excellent piece of natural bush-

land will be a permanent refuge for the many species of local flora thriving there. Dusky Wood-swallows and Black-faced Cuckoo-shrikes were noticed here.

Next we walked over Mrs. Bennett's Deep Lead property, with Fringed Heath-myrtle (*Micromyrtus ciliatus*) a dominant plant and very floriferous. A Shingleback Lizard or Stumpy-tail (*Trachydosaurus rugosus*) was examined, and tertiary fossils in ironstone were pointed out. A remarkable phenomenon was seven different species of fern growing in an old mine shaft twenty feet deep. Neil alarmed some of the party by climbing down most of the way, but he shrugged off the danger by saying he had often gone right down in his boyhood days. The nearest other ferns are in the Gramineans. *Cyathea australis*, *Adiantum aethiopicum*, and two species of *Blechnum* were identifiable. The original spores were obviously blown here by the wind, but no spores are being produced by these ferns because the conditions are not right for the reproductive processes to be set in motion. A huge area surrounding a large dam was covered in *Micromyrtus*. Back in the bus the writer sat next to Mrs. Bennett, who pointed out the unusual monument to the Deep Lead miners, erected in 1951, and consisting of two tool-carrying miners between a goat and a sheep. Presumably the goat is the animal symbol of the hectic days when Deep Lead was a prosperous and populous town and the sheep represents the succeeding pastoral era. Among the Deep Lead pioneers were the family of the late state school inspector, Mr. James Davidson, who did much to encourage in pupils a love of our native flora and fauna, a great lover of our birds. "Shepherd's Gold: The Story of Stawell", by C. E. Sayers, contains full historical details about Stawell district.

Readers' Nature Notes and Queries

These columns are available for all members, young and old, to bring before others their own observations in nature. Correspondence may be sent to the Editor, 54 St. James Road, Heidelberg.

Little Cuckoo-shrikes and White-winged Trillers

These notes come from Mr. Victor Jacobs, of Narre Warren North.

At Easter, 1966, I made my first sighting of a Little Cuckoo-shrike between Stawell and Landsborough. My comments in *Vict. Nat.* 8 (7), July, 1966, p. 169, evoked comments from Jean Galbraith and Mrs. J. A. Denney on the same species: *Vict. Nat.* 8 (9), Sept. 66, p. 231. In this latter magazine I also made a note of first sighting of a White-winged Triller at Eildon.

Since then I have not read any further notes from readers concerning these two species. The Little Cuckoo-shrike has been to me a rather rare bird. During January 1968 in the sand dunes west of Bastion Point I glimpsed a pair of these birds with a young one. I did not sight the Triller again until September 1968, when I called in at Lake Hattah. There, just north of the dry lake bed, I watched a pair of these birds (mainly the male), enjoying both their voices and their antics. From a vantage point on a fallen tree, the male would swoop into the long grass, retrieve a large hairy caterpillar, and return to the log. The next procedure was to slam the body of the caterpillar repeatedly against the side of the log until it was evacuated, and being thus tidied up it was quickly swallowed. Next day amidst the large Bulokes, half a mile south of the lake, two more males and one female were seen and heard.

On 1 November, at a Gould League of Bird Lovers' Field Day at Eltham Park, a pair of Trillers were seen returning to the high branch where they had built a nest. They were the first to be seen in the park since 1963. We were glad to see them, for the paucity of natural species in the park made this outing less like a Field Day, and more like a museum visit. The lecturers at the Bird Stations, armed with birds on loan from the National Museum, did a magnificent job under the trying condi-

tions; and the children showed a remarkable restraint, considering that the Ravens, Magpies, Mudlarks, Crimson and Eastern Rosellas, Noisy Miners and Blackbirds that they saw, had long since been unable to flap a wing. Man, his buildings, and immigrant birds in the shape of sparrows, starlings and mynahs, are monopolising Eltham Park. The editor mentioned that this very state of affairs was being remarked upon in the early 1930s, *Vict. Nat.* 83, p. 164.

To bring the birds back to Eltham seems to be an insurmountable problem at present; and to find suitable open areas within range of metropolitan schools, not easy.

With these thoughts in mind, Messrs. Mudge, Thomson, and Jacobs headed towards Churchill National Park on Cup Day. Not all the populace was following the horses, for a couple of large-scale picnics had filled the park more than I had seen before. Cars and people were there in abundance, and as a couple of little girls had lost themselves, there were even cars on the walking tracks. This National Park has now been completely fenced, and a new road constructed outside. Now the park can be closed and locked at night; which is a great improvement over the early days when anyone could have access at any time.

We spent two hours in the park, and in spite of the number of people, recorded twenty-seven species; many of which were plentiful. The only species which we did not see in its usual abundance was the Bell-Miner. The massive colony of these birds disappeared unaccountably in the short space of one weekend. We were pleased to hear a couple call and hope that the colony will build up again to its former size.

An elusive call led us from alongside the channel into the scrub. A copperhead snake, being surprised by us, looped on his track so that we detoured, but still tracked the call. At the other edge of the belt of scrub we located and identified our quarry as a White-winged

Triller. Just then a larger grey bird entered the area and perched with its mate close by. Three pairs of binoculars focused and three watchers agreed that we had sighted a pair of Little Cuckoo-shrikes. One of the trio had not seen the species for many years.

Later, during a telephone conversation with Reg Garner, the park ranger, I discovered that last spring he had counted ten pairs of the Trillers in the park at that time, but was not aware of the Little Cuckoo-shrikes. He also told me that the Yellow-tailed Black Cockatoos had raised a family in the park and had also been seen feeding in Police Paddocks. It is heartening to know that the proposal of a car racing track for this area has been quashed, and that eventually the Police Paddocks will be fenced and become an extension of the park.

With the Trillers so common this year I decided to walk through the adjacent wood at Narre Warren North to look for them therein. They were not apparent, but I recorded 29 species of bird during my short walk, and included in this total was a pair of Satin Flycatchers.

Did you have Trillers in your area this year? It could have been a record year for them, both in distribution and in number. If you have any records let us hear of them.

Cane Beetles and Toads

Mr. A. Fellows from Charters Towers, Queensland, again supplies some interesting observations.

A few years ago before Gammaxene had proved such a boon to sugar-cane farmers, on certain warm still evenings just before dusk, an odd cane-beetle or two might be encountered in the cane-fields.

Usually that presaged a hectic time to come very shortly, and if standing in a clearing in the cane, a sudden onrush of buzzing beetles made collisions, at least with some of them, inevitable.

Where they struck one, there they remained awhile, departing only when no beetle of opposite sex was found.

The din was terrific, their search in all directions frenzied, and one went out of bombarding range of a necessity. Such beetles strike with great force. In the dim light one could just discern the rapidly flying creatures in their desperate search, but the noise and numbers grew quickly less, to soon terminate entirely.

Then a flash-light search showed all beetles in twos whether on cane, fence-posts, or tree-trunks. Odd ones had "crashed", and an industrious toad squatting below a light-bulb made the customary "bow" and tongue-flash scoring one half-dead beetle.

One moment the beetle was in the toad's mouth, but in the next moment, both of the toad's fore-feet raked its own mouth in desperation to eject the beetle forth-with. Grown beetles are obviously not a toad's diet under such circumstances.

I had noticed smaller, softer beetles were eaten readily, but despite several attempts at different times to "coax" a toad to try a hard-cased cane beetle, I never saw a toad try to swallow one except the occasion cited. Perhaps they all learnt the "hard" way just how unpalatable cane-beetles could be.

If they failed as beetle-eaters, they excelled as termite devourers, so doing a useful purpose that way.

One hears much argument about the toads, fouling many water-containers, etc., with dire results to poultry and domestic animals drinking there. Therefore their "economic value", I will leave to the judgement of others. Meanwhile, they multiply and range further north and west where they were never known before.



A rather dubious toad eyeing a cane beetle.

photo: Paul Cahan

The First Victorian Record

of the

Spotted Stingaree

Urolophus gigas Scott

by JOAN M. DIXON*

On 30th October 1968, Mr. N. le Soeuf netted a small ray in about three feet of water at Blairgowrie, Port Phillip Bay, Victoria. The specimen was transferred to Mr. C. S. le Soeuf's aquarium at Rosebud and was collected from there by the museum on 21st January, 1969. It was identified as a female spotted stingaree, *Urolophus gigas*.

The total length of the specimen is 326 mm., and the maximum width across the disc 176 mm. It is now registered as A351 in the collections of the National Museum of Victoria.

This species is easily recognisable in life. (Plate 1). The upper surface of the disc is predominately black, becoming purplish-brown at the periphery. It has a distinctive pattern of clearly defined, whitish, irregularly shaped markings which are absent in the mid-dorsal region. Within each of the pale areas lie numerous small black spots. The underside of the disc is pale

at the centre and grey-brown towards the margin. A small adipose fin occurs on the tail just in front of the spine.

This specimen constitutes the first record of *Urolophus gigas* from Victorian waters. The species was described by Scott (1954) from a specimen collected at Port Noarlunga, South Australia, and the holotype lodged in the South Australian Museum. It has since been recorded from Spencer and St. Vincent Gulfs, South Australia (Scott, 1954).

Acknowledgments:

I wish to thank Mr. C. J. M. Glover (South Australian Museum) and Mr. R. J. McKay (Western Australian Museum) for their assistance in the preparation of this paper, and Mr. C. S. le Soeuf for providing the specimen.

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Plate 1.

Urolophus gigas Scott—Dorsal View of the first Victorian record. Collected from Blairgowrie, Port Phillip Bay, Victoria, October, 1968.

Photo: F. Guy

Book Reviews

A Portfolio of Australian Birds

by WILLIAM T. COOPER

Text by KEITH HINDWOOD

(Published by A. H. and A. W. Reed)

Stiff cloth cover with illustrated dust jacket. Approx. 11½" x 14". 52 pages with 25 colour plates. Price \$9.95.

In William T. Cooper, Australia has a bird artist of outstanding ability. This collection of 25 bird paintings of our native species are to my mind the best ever produced by an Australian artist. It is in fact, extremely hard to differentiate between the plates, but I would select the plates of the Powerful Owl, the Eastern Whipbird, the Eastern Rosella, and the pair of Paradise Riflebirds as really outstanding examples of Mr. Cooper's ability. These masterpieces are painted by an artist who has grown up in the Australian bush, and who knows each individual species intimately.

The text with each illustration is by Australia's leading ornithologist, Keith

Hindwood, of Sydney, N.S.W. It covers all fields relevant to the species—its history, its food, its breeding, its plumage changes, and its distribution, as only Hindwood can tell it. The combination of William T. Cooper and Keith Hindwood has produced a portfolio of outstanding artistry and fact. It is to be hoped that they will not stop at just this one book. We need many others of this standard; and if the 25 species covered in this volume give an indication of what we can expect in the future, then we can all look forward to further outstanding portfolios by this combination.

W. R. W.

Flowers and Plants of Victoria,

by G. R. COCHRANE, B. A. FUHRER, E. R. ROTHERAM and J. H. WILLIS.

Published by A. H. & A. W. Reed, 1968.

216 pages, inc. 543 col. plates, glossary, index, selected references, and biographical notes. \$9.95.

The British botanists Gilmour and Walters once wrote feelingly of gathering botanical books as "implanting a rival but compatible, passion in their breasts". The present volume could set any plant lover down this slippery and enchanting incline.

It is a book presenting excellent colour plates and botanical notes on over 500 Victorian plant species and sixteen essays on the flora of selected Victorian regions/habitats. Enjoyment

will be found in every aspect. The preface by Professor M. J. Canny, Professor of Botany at Monash University, with its common-sense attitude and advice relating to scientific names, provides a warm welcome to the beginner. The photographs are both beautiful and capable of leading to identification. Their colour may very occasionally be rather artificial but this is a minor point, for in general they charm the reader with their impact and clar-

ity. J. H. Willis's semi-systematic summaries of species provide compact and, it need hardly be said, expert reference information. The essays by G. R. Cochrane are happily ecological in approach and instructive in tone, providing the field naturalist with the knowledge he seeks. A surprising amount of stimulating fact, e.g. "Almost 600 species of vascular plants are known for the Victorian Range alone." (Grampians) is packed into these chapters which deal with such areas, as Box-Ironbark Forests, Heathlands, Fern Gullies, and Rocky Gorges and Escarpments.

It has obviously been very difficult for the authors to decide upon regions/habitats to include, or the terminology to choose in this regard, and it is to be realized that the main emphasis of the book is towards instruction upon our flora, rather than the organization of the botanical ecology of the State. The communities and regions chosen, for example: Saltmarshes, East Gipps-

land, Swamps Streams and Riverbanks, are ones every field naturalist visits and for which he needs an illustrated reference such as this. Thus a wide coverage of the State's flora is included pictorially, and the index is ample in species reference but would be even better if it were to include Family names as well. A useful glossary of botanical terms is included, also a list of protected plants,—essential information for those who wish to collect even occasional plant specimens, and a timely reminder to all.

The really splendid thing however is the fact that here is a book for Victorians, akin to those provided for British field naturalists long ago; a beautifully illustrated book on our flora, comprehensive enough to be worth-while, and a work of true natural history which will, for many, provide an exciting introduction of botanical delights that await them in the field.

A. R. McEvey.

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The 116 species known and described, and illustrated by line drawings, and 30 photographs. Price 75c.

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This describes 120 toadstool species and many other fungi. There are four coloured plates and 31 other illustrations. New edition. Price 90c.

THE VEGETATION OF WYPERFELD NATIONAL PARK, by J. R. Garnet.

Coloured frontispiece, 23 half tone, 100 line drawings of plants and a map. Price \$1.50.

Address orders and inquiries to Sales Officer, F.N.C.V., National Herbarium, South Yarra, Victoria.

Payments should include postage (9c on single copy).

The Amphibian Fauna of Victoria: Two New Records and a Checklist

by A. A. MARTIN and M. J. LITTLEJOHN*

Introduction

Since Moore's (1961) checklist of the amphibians of Victoria, the following additional anuran taxa have been found to occur in the state: *Hyla maculata* Spencer (Copland, 1961); *Hyla phyllochroa* Günther (Copland, 1962); *Hyla verreauxi verreauxi* Duméril, *Limnodynastes dorsalis dumerili* Peters, and *Limnodynastes dorsalis insularis* Parker (Moore listed only *Limnodynastes dorsalis* Gray) (Littlejohn, 1963); *Hyla aurea aurea* (Lesson), *Hyla jervisiensis* Duméril and Bibron, and *Uperoleia marmorata* Gray (Littlejohn, Martin and Rawlinson, 1963); *Crinia victoriana* Boulenger (Littlejohn and Martin, 1964); *Limnodynastes fletcheri* Boulenger and *Neobatrachus centralis* (Parker) Littlejohn, 1966); *Hyla verreauxi alpina* Fry (Littlejohn, 1967); *Heleioporus australiacus* (Shaw) (Littlejohn and Martin, 1967); and *Mixophyes balbus* Straughan (as *M. fasciolatus* Günther; Littlejohn, 1969; see Straughan, 1968).

The aim of the present paper is to report on the occurrence of two additional anuran taxa in Victoria, and to provide a current checklist of the amphibian fauna of the state.

NEW RECORDS

Limnodynastes dorsalis interioris Fry.
Specimens collected: 2 miles S. of Bethanga Bridge, and 4 miles N.W. of Koorilla.

Although not recognized by Parker (1940), *L.d. interioris* is clearly sepa-

rable from *L.d. dumerili* on the basis of both adult morphology and mating call structure (Martin, unpublished). The main distribution of *L.d. interioris* is in the Riverina district of New South Wales, and the previous southernmost record is Mirrool Creek, N.S.W. (Fry, 1913).

Uperoleia rugosa (Anderson)

Specimens collected: 4 and 5 miles N.W. of Walwa, Burrowye, 1.5 miles E. of Borrowye, and Talgarno.

Moore (1961), in the most recent review of the genus, synonymized *U. rugosa* with *Uperoleia marmorata*. However, our data indicate that not only are these two taxa distinct, but in addition, that *U. rugosa* actually consists of a complex of two sibling species (Forms A and B of Littlejohn, 1967), which have markedly different mating calls. The above records all refer to Form B (characterized by a long, unpulsed mating call). The previous southernmost record of *U. rugosa* is Urana, N.S.W. (Parker, 1940), but this is almost certainly referable to Form A (characterized by a short, pulsed mating call; Littlejohn, 1967, and unpublished). We have also collected *U. rugosa* (Form B) in the Delegate area, N.S.W. (Littlejohn, 1969), suggesting that it may enter Victoria in East Gippsland as well as in the Upper Murray region.

CHECKLIST OF VICTORIAN AMPHIBIA

When the taxa listed in the introduction, together with the two new records reported here, are added to Moore's (1961) list, the state anuran fauna

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totals 35 forms. However, two of Moore's records are almost certainly in error. Firstly, he lists a specimen of *Adelotus brevis* (Günther) from Healesville. We are familiar with *A. brevis* and have never collected it at Healesville or, indeed, anywhere in Victoria. Our southernmost record of this species is near Sydney, N.S.W. Secondly, Moore (1961) lists three specimens of *Hyla citropa* (Tschudi) from Aberfeldy. We are likewise familiar with this species and have no record of it south of Royal National Park, N.S.W. Possibly, as discussed by Copland (1961), the record of *H. citropa* is based on specimens of *H. maculata*. At any rate it seems wise to remove both *A. brevis* and *H. citropa* from the state list. The Victorian anuran fauna then contains the following 32 taxa:

Family: **HYLIDAE**—

Hyla aurea aurea (Lesson)
Hyla aurea raniformis (Keferstein)
Hyla ewingi Duméril and Bibron
Hyla jervisiensis Duméril and Bibron
Hyla lesueuri Duméril and Bibron
Hyla maculata Spencer
Hyla peroni (Tschudi)
Hyla phyllochroa Günther
Hyla verreauxi verreauxi Dumeril
Hyla verreauxi alpina Fry

Family: **LEPTODACTYLIDAE**—

Crinia haswelli Fletcher
Crinia laevis (Günther)
Crinia parinsignifera Main
Crinia signifera Girard
Crinia sloanei Littlejohn
Crinia victoriana Boulenger
Heleioporus australiacus (Shaw)
Limnodynastes dorsalis dumerili Peters
Limnodynastes dorsalis insularis
 Parker
Limnodynastes dorsalis interioris Fry
Limnodynastes fletcheri Boulenger
Limnodynastes peroni Duméril and
 Bibron

Limnodynastes tasmaniensis Günther
Mixophyes balbus Straughan
Neobatrachus centralis (Parker)
Neobatrachus pictus Peters
Philoria frosti Spencer
Pseudophryne bibroni Günther
Pseudophryne dendyi Lucas
Pseudophryne semimarmorata Lucas
Uperoleia marmorata Gray
Uperoleia rugosa (Andersson)

This list should not be taken as a complete or final one for the state. It is likely that current research in the *Hyla ewingi* complex, *Limnodynastes dorsalis* complex, *Limnodynastes tasmaniensis*, and *Neobatrachus pictus* will reveal the presence of at least four additional taxa. We also consider it extremely probable that *Hyla caerulea* (White) enters the extreme north-western corner of the state, since Mr. J. N. Hobbs (pers. comm.) has collected it at Dareton, N.S.W., only a quarter of a mile north of the Murray River.

Acknowledgments

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The Future of Naturalists' Clubs

by A. J. SWABY

In the exploration of this old continent and its living things, the F.N.C.V. and others in other states helped very considerably. The pioneering era has almost passed, except in the lower plants and animals. There, much remains to be done and few are doing it—merely in description and classification. Insects and related animals have been described in the adult forms and named. In very many species, however, nothing is known of their life histories. Quite apart from interesting study, these lower creatures are of immense importance to man-

kind as friends or foes. How do they live? What are they doing? How can we destroy the foe without injury to friend—and to ourselves? What will be the effect on the human race from pollution of air and water?

There will always be nature-lovers coming along to learn what is *known* of plants or animals or rocks, but there should be many, curious enough to explore the *unknown*, or clubs will languish.

What are you investigating?
How can we, the casuals, assist?

* * *

An Astronomical Note for June

The planet Mars is at present on one of its closer journeys from the Earth, and it may be seen quite brightly, and appearing reddish in colour in the eastern sky from about

5.30 p.m. Mars comes closer to the Earth at about 17 year periods.

Jupiter may also be seen now, higher in the northern sky, when viewing Mars.

The Burning Question

(F.N.C.V. Excursion to Daylesford, 16 March '69)

by EDNA B. KING

At the February general meeting of the F.N.C.V. an address was given by Dr. E. M. H. Ealey of Monash University in which the question of fuel reduction burning in forestry areas was one of the salient points. Because this is a controversial issue and because of the intense interest aroused, an excursion to the Forestry Commission areas in the Daylesford district was arranged.

Six members of the Forests Commission personnel, comprising Mr. D. M. Thompson, Divisional Forester, Ballarat; Mr. I. F. McLaughlin, District Forester, Daylesford; Mr. G. Griffin, Forester, Daylesford; Mr. A. Hodgson, Fire Research Officer, Melbourne; Mr. A. Heislars, Fire Research, Daylesford and Mr. R. Cowley, Management Officer, Ballarat, were on hand to meet the excursion members and guide them on the tour. The rendezvous for lunch was at the Jubilee Lake, Daylesford, and then a sixty mile tour of the forests was undertaken, led by the officials.

Four stops were made to examine the effect of wildfires and fuel reduction burning, recovery of vegetation

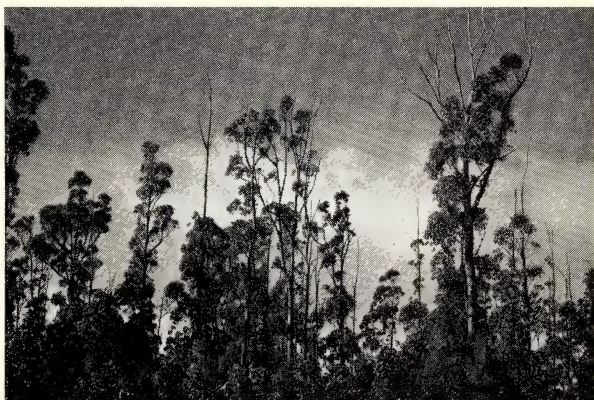
and allied forestry procedures. Forests Commission personnel gave talks, well illustrated with pictures, maps and graphs on all these aspects, as well as explaining methods of fire control and detailing projects now in hand for flora and fauna surveys.

The first stop was made in the Werona Forest area, where the devastation caused by the wildfire of 8 January was inspected. The conditions prevailing on that day, 100 degrees temperature and high winds, resulted in a very severe wildfire, virtually uncontrollable by the existing fire service, which eliminated 90% of the tree canopy and ground vegetation, along with those animals unable to seek shelter in dams and possibly some birds. Several weeks after the burn, four heavy showers fell, depositing $\frac{1}{2}$ to $1\frac{1}{2}$ inches of rain over the area, causing flash floods, and as there was no ground cover, top soil, organic matter, seeds of wildflowers and low growing shrubs were washed into hollows. This in turn is the beginning of erosion.

The first epicormic shoots on eucalypts appeared approx. 4 weeks after

Eucalypts showing die-back after 1951 and 1962 wildfires. (Langdon's Hill Area)

Photo: Author



June, 1969

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Wildfire area
in Werona Forest
showing 1969
January burn.
Note developing
epicormic shoots.

Photo: Author

the fire, when the area was visited on 16 March, *Poa australis*, *hibbertias*, *Thriptomene* and acacias were showing vigorous regrowth from rootstocks and rhizomes, although a number of acacia seedlings were found.

The second area visited was Langdon's Hill which had been burned by wildfires in 1951 and 1962. Most of the mature trees showed evidence of "negative increment" or dying back, caused by the destruction of the crown and subsequent development of epicormic buds no longer suppressed by an inhibiting auxin produced in the leaves of the crown. This development of dormant buds ensures the survival of eucalypts after the most severe fires; however, timber from these trees generally is of a degraded nature and unsuitable for commercial purposes. Defects, such as occluded knobs in the stem where epicormic shoots have died off, allowing infection to set in, "dry side" occurring where the cambium has been killed providing a point of entry for boring insects and fungi, and gum veins appearing where bark is damaged, are causes of low quality timber. There was a fairly heavy ground cover of shrubs, mainly thickets of *Acacia mucronata*, *A. verticillata*, poa and evidence of annuals such as *Helichrysum*, *Vahlenbergia* and *Craspedia*.

The first effects of fuel reduction burning were to be seen at our third stop. This area was control burned in the Spring of 1968 and regeneration of

ground cover was well advanced, with climbers (*Hardenbergia*, *Kennedya*) *Poa*, "wire-grass" (*Tetrarrhena juncea*), *Lomandra* spp., bracken and under shrubs all showing good growth. The orchid commonly known as "parson's bands" (*Eriochilus cucullatus*) was in bloom and fairly plentiful in this area. The tree canopy was not damaged and scorch marks extended 3 to 4 feet up the trees.

The final area visited provided a contrast in that one side of the road had not been burned for approx. 30 years and the other burned in the Spring of 1966. In the long term, fire-free area, trees were mature with heavy foliage at the crown, allowing little light to penetrate, and as a result ground cover consisted of very thick mats of wire-grass, which had almost smothered the few remaining shrubs, mainly *Acacia mucronata* and an odd eucalypt sapling. On the other hand, the area burned in 1966, had a variety of ground vegetation—shrubs, *Poa*, *Gahnia*, etc. and numerous eucalypts saplings.

Fuel reduction burning means the controlled firing of a specific area in ideal conditions, (e.g. after light rain, low winds and high air humidities), so as to reduce the ground litter, comprising leaves, twigs, bark, grasses, etc., to a level where wildfires will not attain high rates of spread and intensity and can be easily controlled. Spot fires are lit simultaneously on a grid pattern, spaced according to prevailing condi-

ions and to ensure that all fires link up at the end of the burning period and are extinguished. Pockets of vegetation are left unburned and an incompletely burned layer of fuel remains, providing shelter and forage for mammals, particularly small, ground-frequenting species. Flames are only about 1 foot high and travel at a pace that allows animals to avoid them. The tree canopy is not damaged and bark only scorched to a degree not harmful to the trees. Eucalypts have thick, heat resistant bark, developed to enable them to survive fires, but the intense heat generated in wildfires can cause severe damage as previously stated in this article.

This program of fire ecology survey has only recently been initiated and Forestry Commission personnel admit that results obtained so far are inconclusive and in some cases theoretical. However, it is known that fires do change habitat rather than destroy it and so species of birds and mammals change in accordance with the habitat. For example, wallabies prefer thickets and when these are converted to open grazing through fires, kangaroos take their place.

The primary purpose of forests is the production of timber for commercial uses, and previously the survival of animal and plant life was of secondary

importance. The surveys being undertaken at present are planned to make a broader use of forests from the conservation point of view, due to mounting interest being taken by naturalists and others concerned with research into these matters.

The advantages of fuel reduction burning as put forward by the Forests Commission have been fairly well covered, but a number of questions remain to be considered. These are—

- (a) Fuel reduction burning can harm regenerating trees of an early age.
- (b) Nesting sites of some birds (wrens, finches), are reduced by thinning out of vegetation.
- (c) Young birds in nests are destroyed because of Spring burning.
- (d) Displacement of animals preferring a habitat of thick bushland.
- (e) Some unique botanical species could be lost because of repeated fires destroying plants before seedling is completed.

Many naturalists disagree with the principles of fuel reduction burning, however, I am sure all F.N.C.V. members who made this trip regarded it as informative and worthwhile and were most appreciative of the Forests Commission personnel who organized such an interesting tour.



Forest Commission
Personnel
addressing members
in the Werona
Forest

Photo: Author

Field Naturalists Club of Victoria

General Meeting 12 May

The hall was filled to capacity when the President opened the meeting and read the apologies. The minutes of the April meeting were taken as read.

New members as listed in the *Vict. Nat.* were then elected.

It was formally moved by Mr. McInnes that Mrs. Misson, a member of the club for over 40 years, be given honorary membership to the club. This was passed and both Mrs. Misson and Mr. R. W. Bond (who had had his honorary bestowed at the April meeting) took receipt of their presentation.

Presentation of the 1968 Natural History Medallion.

Mr. Edmund Gill (Ass. Director National Mus., Pres. Royal Society of Vic.) made the presentation, of the 1968 Natural Hist. Med. to Dr. Norman B. Tindale. In his speech introducing Dr. Tindale, Mr. Edmund Gill, qualifying his use of 'expert' in describing Dr. Tindale, said that he was an expert in the sense of being at the top of his present line of study. He claimed that Dr. Tindale has made his name in two fields of natural history—first as an entomologist and secondly in the field of anthropology. Dr. Tindale in reply remarked that he had worked so long in the field that he was regarding himself as a bit of an 'old fossil', and that the Aborigines nicknamed him 'Chilpy', meaning 'the old fella'. The President thanked all concerned with the Australian Natural History Medallion.

The subject for the evening was on the 700 authentic aboriginal tribes once in Australia, and the address was given by Dr. Tindale. In his youth Dr. Tindale was on an expedition, mapping Groote Island and was given instructions by Sir Baldwin Spencer to 'Collect all information about aborigines in that island'. Dr. Tindale became fascinated in the study of Anthropology and went to the University to pursue the study of this subject. He has since been the head of the Anthropology section of the South Australian Museum and held the position until his retirement. Whilst working with the S.A. Mus. Dr. Tindale was asked to write an article for a journal, and upon submitting a map of Arnham Land, showing

the tribal boundaries with hard lines, had it returned with the editor's comment, 'Aborigines don't stay in one area; they wander everywhere'. The map was subsequently substituted for one showing only dotted lines, but from this disappointment came Dr. Tindale's conviction that he would someday map the tribal boundaries for the whole of Australia.

Dr. Tindale made it clear in his lecture that the aborigines do observe tribal boundaries which are limited by their mode of travel, walking, and also since the women needed to dig for vegetable food they did not want to encounter unfamiliar food. Food and water then was one reason to limit their boundaries and also since other tribes resented 'strangers' this also influenced their boundary making. Dr. Tindale showed that these boundaries were made in both physiographic and geographic phenomena. Sometimes they were made by actual geographical forms, rivers, mountain ranges etc., but more often a broad area i.e. the boundary set by the distance that could be walked in one day. Usually a tribal area was surrounded by the tribal boundaries of five or six other tribes.

Amongst the aborigines, Dr. Tindale found that they held the family as a very important unit. One of the reasons for this is because the knowledge of the area within a tribal boundary is handed down from father to son, and this knowledge concerning the safest place in time of drought, rains, etc. concerned the safety of the family unit and so emphasized the importance of the unit called a clan.

Another important unit to the aborigine is the "Horde"—this is the extended family group, which is the family plus those families that they exchange women with. These families often come together to form "troupes" or tribal units. The normal size of these tribes are about 500 strong, for if they were any less they could have difficulty in holding their territory if not their natural economy in women. If their troupe was any larger, they would have difficulty in cohesion.

In Australia there were about 700 troupes or tribal units although in Australian literature there may be listed thousands. The reason for this is that where there may be one tribe (called by the name that they identify themselves

with) all the other tribes around about may have several different names for that one same tribe.

Dr. Tindale claimed that the aborigines came to Australia over 30,000 years ago from Asia, after surviving a sea voyage. He said this was during the ice-age when so much of the sea was taken up with ice and the water level was 300 feet lower than at present, and there was dry land to New Guinea and Tasmania was attached to the mainland.

Dr. Tindale said there are three different types of aborigines in Australia, the Barrineans, the Murrayians and the Carpenterians.

Talking about the aboriginal way of life, Dr. Tindale stated that the men spend most of their time hunting, whilst the women collect vegetable seeds. Food in any one small area is soon exhausted and they must then move on to a new place. As a result of these movements tracks evolved.

Next, Dr. Tindale talked about the camping sights of the aborigines. He said that when choosing a camping sight, they took into consideration that the sand must be warm, and there must be sufficient visibility as well as having water and firewood and being able to provide shelter.

When talking about one of their most important commodities, water, Dr. Tindale said that many aborigines depend completely on rock-holes. They are commonly referred to as rock-holers and are the most nomadic. They are, because of their precarious position considered dangerous and are despised by many of the other tribes.

The food of the aborigine depends completely upon the providence of his territory. Some use grass seeds to make a diet which consists completely of a kind of bread which they are able to make. So the more fortunate tribes who can hunt for their food generally despise these people, calling them "dun eaters". Dr. Tindale pointed out that the teeth of the hunting tribes are far superior to those of the "dun eaters" as a result of their different diets. Some eat the flower, seed pods, stems and roots of the water-lily. Whilst other tribes have as a basic food, lizards, which when caught are killed and put under a "string belt" until the whole belt is filled. Other tribesmen may feed on the turkey bustard and the emu, catching them after herding them to their water-hole which they have poisoned.

A very important commodity to the economic life of the aborigine is that of chert and flint-stones, which make good cutting instruments. There were also other very important areas of economic value to the aborigine that grew wood for spears. Also resin from Yaka and grass trees which was melted down to make handles for knives and other instruments. These important areas were often personal possessions of a tribe and these commodities were used for trade.

Nature Notes and Exhibits—Mr. W. Woollard showed his prototype of an improvement on the Victorian Naturalist microscope, and welcomes interest from people wishing to build their own.

Mr. A. J. Swaby exhibited the tent shelter of the Turret Spider—constructed mainly from the flower stalks of the garden geranium *Pelargonium zonale*. Also from Mr. Swaby were two specimens of "lily"—*Calostemma luteum* (Yellow Garland Lily), and *Crinum flaccidum* (Murray lily). The shoot from the latter seed could be seen to have entered the soil to form the bulb. On the bean shoot, the leaves had grown, and from there will come the stem. He concluded by saying that at this stage the plant should be potted.

R. Condron exhibited a specimen of the Long-haired Grasshopper from the summit of Mt. Donna Buang; and also some phasmatids (*Didymuria violescens*) which appeared in plague proportion in the Powelltown district earlier this year. They were combated by aerial spraying.

Alan Morrison showed what was thought to be the egg casing of a shark. It was found on the beach at Cape Liptrap in April.

Geology Report, 5 March

Thirty-two members and visitors attended. The speaker on the occasion was the Chairman, Mr. Davidson, who gave an account of a journey through most of the western half of the continent. His talk was supported by a large number of slides of Geological formations taken during the trip, in which a Landrover was used as transport. The route was through Wilpena to Mt. Painter, where Torbenite was collected from the pre-Cambrian rocks, up to the Opal mining areas of Andamooka and Coober Pedy, then on to Ayer's Rock and the Olgas. Mention was made to the hardness of the Conglomerate of the Olgas, and the large size of some of the

boulders in it. A visit was made to the Henbury meteor crater near the Finke River; then up to Hart's Range, Tennant's Creek and across to Katherine Gorge, which the speaker said was cut in Devonian limestone. The journey then proceeded west to Derby, Broome, and on to Marble Bar, where excellent slides were taken of the banded Jasper. On to Port Hedland where things were happening in a big way. Iron ore from Mt. Newman is being railed on a specially constructed line to the port for transport to Japan. A visit was then made to the Blue Asbestos area at Wittenoom Gorge. The journey then continued to Meekathara, Mt. Magnet, Kalgoorlie, Mt. Monger and Coolgardie. In these highly mineralized areas a large variety of specimens was obtained. Next stop was at Kambalda which the speaker said was another boom area. He said that prospecting and drilling parties were everywhere in search of Nickel. A visit was made to the famous Wave Rock at Hyden, and slides were shown of this. Other places visited before the journey home were Esperance, Ravensthorpe and Norseman, and further collections were made. Mr. Davidson's excellent slides and commentary were appreciated by all who attended.

Botany Group Meeting

8 May 1969.

Twenty-three members and friends were present with Mr. Fairhall in the Chair. The speaker for the evening was Mr. Robert King, whose subject was "Marine Botany". Mr. King gave a general account of plant ecology in the marine environment and this was illustrated with excellent slides. Particular reference was made to the algal communities of the rock platforms in the Point Lonsdale area where Mr. King, with Mrs. Ducker and botany students from Melbourne University, have been carrying out botanical research over recent years. Mr. King described the Point Lonsdale algal flora as probably the richest on the Australian coast. Well over 400 species of algae have been recorded from the area, as well as three marine angiosperms.

The well defined zonation of algal communities was described and illustrated. This zonation corresponds to the relative exposure to seawater, and air and sun between the high and low tide limits, and those belts of marine growth just above and below the tide limits. Some-

times the zonation is classified according to predominant species present, for example Horomosira zone, Cystophora zone, Durvillia zone, or according to high and low water extremes—above high water being termed *supra littoral*, followed by *littoral*, *lower littoral*.

Seasonal variations in the algal species present were illustrated and explained, and a number of common species also discussed with the aid of slides.

Genera illustrated included *Gaulerpa*, *Codium*, *Chaetomorpha*, *Hormosira*, *Ecklonia*, *Macrocystis*, *Cystophora*, *Perithalia* and *Metagonolithow*.

A most interesting talk was concluded with questions from members. The Chairman moved a vote of thanks to Mr. King, and members carried this with enthusiastic acclamation.

An excursion was arranged for Sunday, 8 June combining with the Preston Juniors under the leadership of Mr. Fuhrer. This will be a Fungus excursion and the meeting place is Fern Tree Gully station at 11 a.m.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETINGS

Monday, 9 June—Annual Meeting at National Herbarium, The Domain, South Yarra; commencing at 8 p.m.

1. Minutes, Reports, Announcements.
2. Correspondence.
3. Subject for evening—"Some familiar plants of the family Myrtaceae". Miss M. Lester.
4. New Members
 - (a) *Ordinary*:
Miss Marion Blair, 647 Punt Road, South Yarra 3141. (Interest: Botany.)
Miss Ann Forbes, 9 Hallow Street, South Oakleigh.
 - (b) *Joint Ordinary*:
Mr. and Mrs. B. M. Hall, 464 Glen Eira Road, Caulfield, 3162.
 - (c) *Joint Country*:
Miss Wendy M. Kroker, "Kia Ora", Horsham, 3400.
5. General Business.
6. Nature Notes and Exhibits.

Monday, 14 July—"Field Trips in South Africa". Mr. R. McLister.

Group Meetings

(8 p.m. at National Herbarium unless otherwise stated)

Thursday, 12 June—Botany Group, "Orchids" by Miss C. E. Gray.

Friday, 13 June—Montmorency District Junior F.N.C.

Wednesday, 18 June—Microscopical Group.

Friday, 27 June—Junior Meeting at 8 p.m. at Hawthorn Town Hall.

Wednesday, 2 July—Geology Group.

Thursday, 3 July—Mammal Survey Group. Meeting is held in Fisheries and Wildlife Dept. Library rooms at 7.45 p.m., Flinders St., Extension.

Friday, 4 July—Junior Meeting at 8 p.m. in Rechabite Hall, 251 High St., Preston.

Monday, 7 July—Entomology and Marine Biology Group.

Thursday, 10 July—Botany Group.

Friday, 11 July—Montmorency District Junior F.N.C.

F.N.C.V. Excursions

Sunday, 15 June—Creswick: Leader Mr. J. H. Willis, Fungi and General. The coach will leave Batman Avenue at 9.30 a.m. Fare \$2.00. Bring two meals.

29 August-21 September—Western Australia. The party will leave by the evening train on Friday, 29 August and arrive in Perth 7 a.m. Monday 1 September. A coach will meet the train and will go to Jurier Bay for the first night, then on to Northampton for the four nights following, with day trips to Kalbarrie etc., The party will then go south, staying overnight at Geraldton, Wongan Hills, Merredin and Lake Grace visiting Wave Rock on route, and the Porongurup, Albany via Stirling Ranges (two nights), Manjimup, Busselton (two nights) with day trip to Augusta, Perth (two nights) with optional excursion to Rottnest Island on Wednesday. The train will leave Perth on Thursday evening and arrive in Melbourne on Sunday morning, 21 September. Accommodation is mainly on a dinner, bed and breakfast basis, and cost of the excursion is \$260.00 including deposit of \$50.00 paid when booking. The balance should be paid before 1 August, and those members who have requested a sleeping berth between Melbourne and Adelaide should include the extra \$13.50. All cheques to be made out to Excursion Trust, and sent to Miss M. Allender, 19 Hawthorn Avenue, North Caulfield 3161. Members have until the end of July to pay, but it would assist the excursion secretary if the bulk of the payments were made by the July general meeting. At time of writing there has been a double cancellation, so two seats are available. The excursion secretary would be pleased to receive advice of items of natural history interest along the route, and hopes Western Australian Naturalists in these areas will contact the party, and where possible, spend some time with the excursion.

Field Naturalists Club of Victoria

Established 1889

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron: His Excellency Major-General SIR ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

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Geology: MR. T. SAULT, 9 The Avenue, West Rosebud.

Microscopical: MR. M. H. MEYER, 36 Milroy Street, East Brighton (96 3268).

Mammal Survey: MR. P. HOMAN, 40 Howard Street, Reservoir 3073

Entomology and Marine Biology: MR. J. W. H. STRONG, Flat 11, "Palm Court", 1160 Dandenong Rd., Murrumbeena 3163 (56 2271).

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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